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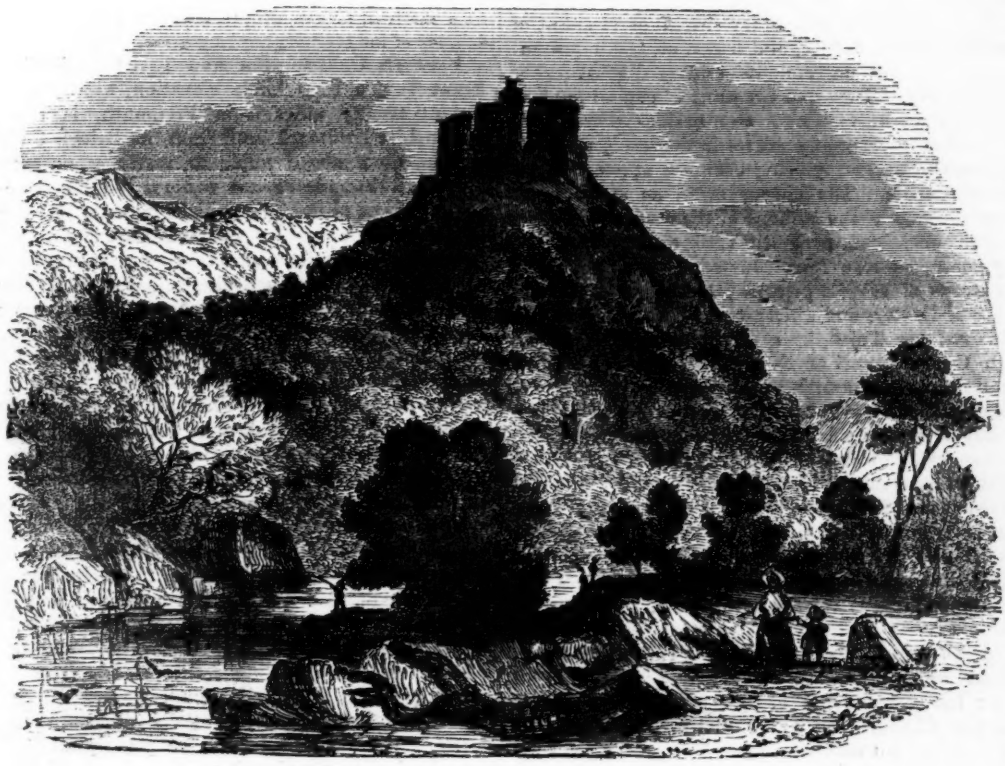
OAKHAMPTON CASTLE.



OAKHAMPTON is the name of a deanery in Devonshire, as well as of a town and a castle situated in it. The deanery contains, besides the town, three small villages or hamlets, named Chissacot, Meldon, and Kigbear.

The town of Oakhampton is surrounded on every side by hills, and derives its chief importance from being in the high road from Exeter to Cornwall: it is situated at about twenty-two miles from Exeter and two hundred from London. The neighbouring forest of Dartmoor affords pasturage to numerous flocks of sheep, the flesh of which is said, from the sweetness of the herbage, to be of superior quality; in consequence of which, great numbers of the sheep are sent to the London market. There is a weekly market at Oakhampton on Saturdays, at which corn, meat, poultry, fish, &c., are abundantly supplied. Oakhampton was one of the first towns that sent members to parliament. It acquired that privilege in the reign of Edward the First: the privilege was exerted in the seventh of Edward the Second: but from that period it appears to have remained in abeyance till 1640, when it was again resumed, and continued until the time of the Reform Bill. The right of election was vested in the freemen and proprietors of freeholds within the borough, about two hundred in number: Oakhampton was, however, one of the boroughs disfranchised by the Reform Act. Before the changes in municipal government, Oakhampton was governed by a mayor, recorder, justice, five principal burgesses, and eight assistants, aided by a town clerk and other officers. The mayor was chosen, on the first Monday after Michaelmas day, by the entire body, from two principal burgesses nominated by the late mayor. The principal burgesses were eight in number; the mayor, the late mayor, and the town clerk included. The freedom was acquired by birth and servitude; the eldest son alone becoming free at his father's death, though not unless born within the borough. But certain changes were made in these matters, by the Municipal Corporations Reform Act.

The living of Oakhampton is a vicarage, in the archdeaconry of Totness, and diocese of Exeter, rated in the king's books at 20*l.*, and in the patronage of the lord of the manor. The church is situated about half a mile from the town: it is an ancient edifice, with a handsome square tower, surmounted with pinnacles, and having north and south porches. There is, besides this, a little chapel called St. James's chapel, belonging to the corporation, and chiefly employed for the performance of divine service during the sessions, and occasionally in Lent.

Oakhampton derives an historical importance from

the circumstance of its having been the head of the Earldom of Devon, and the seat of the hereditary county sheriffs, keepers of the castle of Exeter. The castle, the ruins of which are represented in our frontispiece, was existing longer ago than we have any records of the town. William the Conqueror gave the barony to one of his faithful followers, Baldwin de Brionüs, who had greatly aided him at the battle of Hastings; and it is stated by some writers that Baldwin then built Oakhampton castle on his newly acquired estate; while others think that it existed before the arrival of William in England. Be this as it may, the castle became the residence of Baldwin, and he was created hereditary sheriff or viscount of Denshire or Devonshire, and baron of Oakhampton. Baldwin and his descendants exercised great power in the barony. They had the right of capital punishment over eight manors; and besides these eight, they held a great many others in demesne, upwards of a hundred and sixty being occupied at one time by inferior tenants. The barons acted as stewards at the installation of the bishops of the diocese, claiming on such occasions perquisites to a large amount. They possessed also numerous advowsons, and were the patrons of several priories; holding three fees of the see of Exeter, and ninety-two by knight's service. Edward the Third, by a stretch of power, created Hugh Courtney earl of Devonshire, and the barony passed into that family, in whose possession it remained till the reign of Edward the Fourth, when the earl of Devon was beheaded for taking part with the Lancasterian party against the Yorkists. After this it passed through various hands till the reign of Henry the Seventh, when it was restored to the Courtney family; but one of the branch having been accused of carrying on a treasonable correspondence against the crown, the park of Oakhampton was laid waste, and the castle reduced to ruin. The barony became extinct during the reign of Queen Mary, by the death of Edward Courtney, earl of Devon, without issue, when the possessions were divided among the descendants of the four sisters of his great-grandfather; by which division, Oakhampton castle, with about half the manor, became the property of the family of the Mohuns. During the last century, the entire manor became the property of Lord Clive, celebrated for his connexion with India. It was afterwards possessed by the Prince of Wales; and has since passed into private hands.

The ruins of the castle occupy the summit and declivity of a conoidal mount or eminence, now so thickly clothed with trees, that although the ruins are of great extent, only a very small proportion of them are visible from the high road. The high road from Exeter to Launceston is nearly on a level with the top of the mount, and the mount is skirted on one side by the western branch of the river Ock. In approaching from the south, the mouldering and ivy covered ruins present a peculiarly picturesque appearance, from their combination with the surrounding well wooded scenery. The ivy with which the lower part of the ruins is covered gives all that peculiar beauty which an old building, thus enveloped, is calculated to possess. In allusion to the effect of the ivy on these ruins, Mr. Williams, in his *Picturesque Excursions in Devon*, observes:—

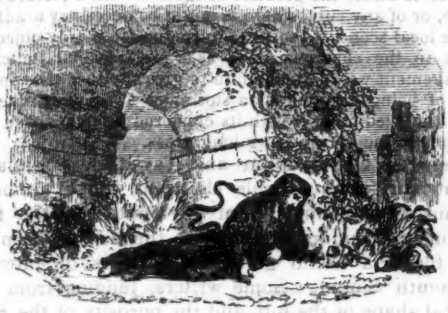
> The ornaments of nature, in the decorations of ruins, are so tasteful, so pleasingly wild, and so harmonized, that nothing from human ingenuity can be added for their improvement. "The long grass that o'ertops the mouldering wall" is an object simple and common; but where is there more effect produced, than when it is agitated by the wind, and responsively vibrating to its motion? The individual and general beauty of mosses, and the richness of lichens, contribute, by the great variety of their colour, to adorn the front of old buildings. All that remains for taste to perform is the removal of ivy when it shades fretted and tracery windows, arched doors, or any neat stone work: these are in general so few, and occupy so small a part of the walls, that, however common in point of architectural beauty they may be, yet, by their exposure, a variety arises, a break is introduced, and something like an object is added. To these productions of the vegetable world, the landscape painter is under the greatest obligation. In a picture of a castle, or of any ruin, where it might be necessary to adhere to the local scene, without the introduction of any object to assist in the character of it as a picture, their judicious management would enable him to give it either the appearance of being agitated by a storm, or a peculiar interest from the ivied foliage, with its clustered branches, and the delicacy of the overhanging long grass.

Between Oakhampton and Tavistock is situated Brent Tor, a remarkable elevation, which, although distant twenty miles from Plymouth, is the first Devonshire landmark seen from the British Channel, and forms a useful guide to mariners on entering Plymouth Sound. Some writers, judging from the conical shape of the hill, and the porosity of the rock of which it is composed, conclude that it is an extinct volcano. There is at the very summit of the Tor a church, of the very small dimensions of 37 feet by 14, which can be seen far out at sea. The erection of such a building on so exposed and elevated a spot is traditionally accounted for thus:—A merchant in one of our colonies, wishing to return with his wealth to his native country, embarked full of those hopes which men, in whose bosom the *amor patriæ* is not extinguished, so fondly indulge. The vessel, wafted by light breezes, pursued her course for some days without interruption; but on one particular evening symptoms of a change appeared, and by break of day the ship was in imminent danger; for the tempest increased to such a degree as to excite the most alarming apprehensions. The agonized merchant, in the fervency of prayer, vowed that should Providence spare him from the storm, he would build a church on the first land he saw. The vessel fortunately rode out the tempest, and Brent Tor presenting itself first, on their approach to the western coast of the island, he piously fulfilled his vow, by building a church on the summit of the Tor, to remain as a memorial of his gratitude and sincerity. Whether this tradition be true or not, it is certain that a few persons still attend divine service in the church, if they have strength and vigour enough to mount. Carrington in his poem of *Dartmoor* speaks of this hill and the chapel upon it, in the following beautiful lines:—

> From yon plain
> Brent Tor uprushes. Even now when all
> Is light, and life, and joy, on Tamar's bank,—
> E'en now that solitary mass is dark,—
> Dark in the glorious sunshine. But when night
> With raven wings broods o'er it, and the storm
> Of winter sweeps the moor, such sounds are heard
> Around the lonely rock, as village seers
> Almost unearthly deem. In truth it wears
> A joyless aspect; yet the very brow
> Uplifts a chapel, and devotion breathes,
> Oft, in the region of the cloud, her hymn
> Of touching melody. Impressive spot
> For fair religion's dome! and sure, if aught
> Can prompt to holiest feeling, and give wing
> To disembodied thought, it is to bend
> The knee where erst the daring eagle perch'd;
> And while, with all it's grossness and its care,
> Earth waits, far, far below, to worship there,—
> There on the wild van of the wildest rock
> That Dartmoor lifts on high.

At a short distance from Oakhampton is situated Oaklands, an elegant seat of Albany Saville Esq., lord of the manor of Oakhampton, and owner of the

castle. Oaklands is a mansion of the Ionic order, built upon a woody slope, about twenty years ago. The house has a finely proportioned portico in front; and its internal arrangements are elegant and judicious. The staircase is grand and spacious, and is surrounded by an elegant gallery, supported by Corinthian columns.



THE CRETAN AND THE SNAKE.

A FABLE.

WHO has not heard of ancient Crete,
Renowned for treachery and deceit*;
For recreant hearts, that loved to frame
Reports to blast a neighbour's fame;
For tongues that spread with foul delight
The sweltering venom of their spite,
Resembling, in Detraction's plan,
The old arch-enemy of man+?
Well might the great Apostle's word
The history of their crime record,
Charge on their holy Prelate's care,
This wholesome precept to declare,—
"Speak ill of no man‡", and impart
Such heavenly lessons to the heart,
As, under God, might bring the young
To heed their thoughts, and curb the tongue.

A CRETAN, to his title true,
A slanderer, and a foul one too,
Who loved to point the bitter jest,
And plant a thorn in virtue's breast;
Whose tongue (that small but powerful part,
The organ of a wicked heart,)
Was used to forge and utter words,
Which cut the soul like very swords,
His lazy noon-tide length had laid,
Beneath a crumbling ruin's shade,
Where ivy, with insidious force,
Helped, while it hid, destruction's course,—
Fit emblem of the slanderer's wiles,
Who veils his malice under smiles.

I warn thee, Cretan, have a care,
For folded 'midst the dry dust there,
A poisonous SNAKE, in cunning guise,
With burnished coat, and shrunken eyes,
Replete with sly and dull despite,
E'en now hath marked thee for a bite!

The blow is struck! and through the wound
Th' injected virus flows around.

But Cretans' flesh was dangerous food;
For strange! O, strange! his evil blood,
Black as the source from whence it sprang,
Too subtle for the serpent's fang,
Poured poison back, like living flame,
Which filled and shook the reptile's frame;
Till, with a deadlier venom tried,
The serpent sickened, writhed, and died. M.

* See Titus i. 12, in which St. Paul quotes a verse of Epimenides, respecting the character of the Cretans.

† The word Διάβολος (Diabolus) from which our word, Devil, is derived, means "A Calumniator."

‡ See St. Paul's Epistle to Titus, the first Bishop of Crete, iii. 2.

*** The above Fable is founded on a Greek Epigram in two lines, in which the story is told of a Cappadocian; but as the Cretans, Cappadocians, and Cilicians were proverbially classed together as of a kindred disposition, (the three Kappas in Greek,—the three C's in our language,) it is, perhaps, not unfair to assign the incident respecting the Snake to a Cretan.

GARDEN HERBS. V.

MINT. *(Mentha.)*

THERE are several sorts of mint growing wild in our fields and woods, some inhabiting a wet and marshy soil, others preferring a dry and open situation. The powerful and refreshing smell of this herb has recommended it to general notice, and we find several species cultivated in gardens for domestic and medicinal uses. Of these the most esteemed is *Spear-mint*, (*Mentha viridis*,) so called on account of the shape of its leaves which are long, and somewhat in the shape of a spear.

This herb is called by M. Valmont Bomare *Menthe d'Angleterre*, (English mint,) and he speaks of it as originally growing in this country only. It is also known in France and Italy respectively by the names *Menthe de notre dame*, (our lady's mint,) and *erba Santa Maria*, (St. Mary's herb,) from what traditionary cause we know not. This particular species must be known to most persons, as being the most useful kind of garden mint, very much employed in spring salads, as well as in sauce for roasted lamb, &c. Its carminative qualities render it a wholesome ingredient in pea soup, and very proper to be boiled with green peas. It is recommended as one of the most efficacious simples, in cases of loss of appetite, nausea, &c., and in the colic pains to which children are subject. For these purposes an infusion of the dried herb is better than the green, as containing the whole virtues of the mint. The juice of spear-mint drunk in vinegar is said to be an effectual cure for hiccups.

The next in value among the different species of mint, (of which there are not fewer than twelve indigenous to Britain,) is PEPPERMINT, (*Mentha piperita*,) much cultivated for medical use, especially in the county of Surry, whence the London market is supplied. It has a smooth purple stalk, and is easily to be distinguished from other kinds of mint by its penetrating smell, and more pungent taste, leaving a peculiar sense of coldness on the tongue. The leaves stand in pairs upon footstalks, and are of a dark green colour, oval-shaped, nerved, and pointed: the flowers are small, and of a purple colour, and appear in August and September.

From this herb, either in its fresh or dry state, a pungent oil is obtained, by distillation with water, called oil of peppermint. This oil is a favourite remedy in spasmodic cases, and has been recommended as a stimulant in Asiatic cholera. *Spirit of peppermint* is formed by adding three drachms of this oil and one pint of water to a gallon of proof spirit, and with a gentle fire allowing one gallon to distil. *Peppermint water*, when well prepared, is found to be an excellent cordial in common cases of spasm and flatulency, and is also of use to cover the nauseous taste, and diminish the painful action of saline and other medicines. The method of its preparation is as follows. Take two pounds of the herb in its dried state, or if fresh, take four pounds; add seven fluid ounces of proof spirit, and two gallons of water, and let one gallon distil. Instead of the herb itself, two drachms of oil of peppermint may be substituted. *Peppermint drops* are a convenient form of oil of peppermint, and may very easily be made by warming four ounces of powdered white sugar over a charcoal fire, and adding twenty-four drops of oil of peppermint and half a fluid ounce of peppermint water. These rapidly stirred together, and dropped on polished marble, soon harden, and may be dried by a slow heat.

PENNYROYAL, (*Mentha pulegium*,) was the favourite mint of the ancients. Pliny recounts to us the

opinions of several physicians who met in his chamber to consult on the virtues of this herb, and comes to the *important* decision that a chaplet of pennyroyal worn on the head is far better than one of roses, to relieve giddiness and disorders of the brain. Dodonæus states that a branch of pennyroyal, either fresh or dried, will much improve the quality of foul or salt water, and may therefore be important to us in circumstances of necessity, when obliged to submit to such a draught. This remark is confirmed by other writers. Gerard says "if this herb be dried, and taken to sea, it will purify corrupt water without hurting those who drink it."

This herb formerly went by the name of *Pudding-grass*, from the custom of mixing it in hogs' puddings. At the time when Gerard wrote his *Herbal*, that is, in the reign of Queen Elizabeth, it was very abundant in the neighbourhood of London, "It groweth naturally wilde," says this quaint writer, "in moist and overflown places, as in the common near London called *Milesend*, about the holes and ponds thereof, in sundry places, from whence poor women bring plenty to sell in London markets: and it groweth in sundry other commons near London likewise." This herb has also been named *Run by the ground* and *Lurk in ditch*, from its creeping nature, and preference for a damp soil. Its stem is prostrate, and very much branched; its leaves much smaller than those of the other kinds of mint; its flowers, growing in whorls, of a lilac colour and very numerous. The distilled water, and the spirit of pennyroyal, may be prepared in the same way as those obtained from peppermint. The old physicians held this herb in much higher repute than it is held by the modern ones. Its virtues in hysteric and nervous affections were supposed to be great, and it was also administered as an anti-spasmodic and expectorant.

The other species of mint common in England are as follows. *Corn-mint*, which is covered with soft white hairs, and has whorls of lilac flowers, also covered with hairs. It grows in corn fields, and Withering says that when cows have eaten of it, as they will do largely towards the end of the summer, when pastures are bare, their milk can hardly be made to yield cheese, on account of a property which this plant has of preventing the coagulation of milk—a circumstance, as he observes, which sadly puzzles the dairy-maids.—*Rugged Field-mint*, with wrinkled leaves and whorls of purple flowers.—*Narrow-leaved mint*, having a branched stem, lanceolate leaves and purple flowers.—*Tall Red-mint*, growing in watery places.—*Horse-mint*, of which Culpeper tells us that "the juice, laid on warm, helpeth the king's evil, or kernels in the throat."—*Hairy-mint*, *Round-leaved mint*, and common *Cat-mint*.

It was an ancient custom for rustics to perfume or scour their tables with mint before serving their suppers.

> Then rubbed it o'er with newly gathered mint—
> A wholesome herb, that breathed a grateful scent.—OVID.

Their meats were also seasoned with this herb, the very smell of which, as Pliny observes, "recovers and refreshes the spirits, as the taste stirs up the appetite for meat." We learn from the same writer that mint was put into milk, to prevent its turning sour, or curdling, and that it was customary to take mint, when milk was drank, that it should not curdle or coagulate in the stomach. It is a common practice at the present day to rub the inside of bee-hives with mint and sugar before the swarm is inclosed in it, as it is supposed to attach them to the hive.

When dry and digested in rectified spirits of wine, this herb gives out a tincture which appears of a fine dark green, or of a bright red colour according as it is viewed by day-light or by candle-light.

Having thus enumerated the uses and beneficial qualities of mint, we proceed to mention the cautions given by some of the old herbalists against the immoderate employment of this and other herbs.

In a volume published in 1689, purporting to show how health and long life may be preserved, we meet with the following cautions respecting the use of herbs.

All herbs are of a slender nourishment, and of a naughty subtil juice and watery, having many superfluities, and therefore in the choice of them observe well these following rules:

1. That you eat but a small quantity of them, and that they may better nourish, use them boyled in broth.
2. That none but lettice be eaten raw, and that also in vinegar, to allay the boyling of the blood, the heat of the liver and stomach.
3. In winter use hot herbs, in summer cool, in spring and autumn temperate.
4. That you do not eat of herbs which begin to put forth their seed.
5. That herbs be eaten at the beginning of dinner, since that almost all are laxative.

Respecting mint this author has the following odd recommendation. "'Tis to be used in winter by old, phlegmatic, melancholy men, but in summer 'tis naught, especially for young choleric men," adding "If you eat but little, and with other cool herbs, it is less hurtful."

Culpeper also tells us that mint "is extreme bad for wounded people, so that they say a wounded man that eats mint, his wound will never be cured."

This herb belongs to Linnæus's fourteenth class and first order, (*Didynamia gymnospermia*,) and is of the natural order *Labiatæ* or *Lamiaceæ*. It may be propagated by seed, but a few bits of its roots will spread into a bed in the course of a twelvemonth, and where a bed of it is once established it is difficult to keep it within proper bounds. Its roots spread in all directions, and the young shoots frequently obtrude themselves into the neat parterre, or even spring up on the well trodden pathway.

GIPSIES OF THE SOUTH OF FRANCE.

SOME pious protestants in the south of France have lately begun to interest themselves in the gipsies, or Bohemians, as they are there called, who live in the forest of the Basque country, and employ themselves chiefly in smuggling between France and Spain. The following account of a visit to one of the hamlets of this singular race is from a letter addressed by two gentlemen of Orthez to their friends in Paris.

"On the twenty-third of August we set out from Salies for the Basque country, with the view of discovering some of the Bohemians. After encountering considerable difficulties, and suffering much fatigue, towards five in the evening we reached the wood of Maherin, where we had been told we should meet with the objects of our search. We did, in fact, perceive some small hovels about eight feet square, and about the same height. Having gone into one of them, we found a young man seated on the floor, and employed in mending a leathern sack, used in transporting contraband articles, such as sugar, tobacco, and coffee. Smuggling is their only trade. This young man had a common musket slung across his back. Not far from him a young woman, who was no doubt his spouse, was engaged in baking on the charcoal embers an Indian corn cake, which two little ones were watching with evident impatience.

"We greeted them in Basque: they replied to our greetings with the surprised air of persons whose looks seemed to say—who gave you leave to come

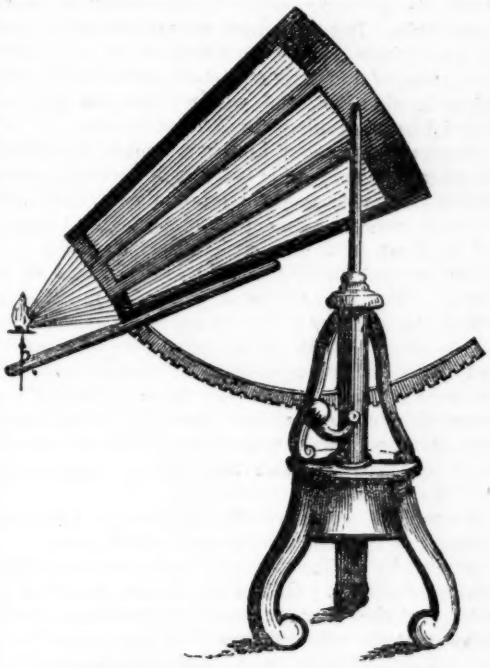
here? But their fierce looks did not alarm us, for we knew that we were under the protection of our good Master. We then inquired in the same language, if they spoke French: they replied that they knew no language but Basque. 'Go for Gracieuse,' said the woman to her husband.—'Not only for Gracieuse,' said I, 'but for all the Bohemians that you can bring with you.' The husband ran off, but soon came back, accompanied by several men who could hardly recover their breath: they had put themselves to such speed, doubtless supposing that the family by which we were surrounded wanted help. Not one of them entered, but they placed themselves before the door in such a way as to prevent our escape had we attempted it. To us they all seemed to look very decided; but without giving them too much time to think, I asked which of them could speak French. The eldest of the party, a man seemingly about fifty, then passed the threshold, and said in Basque—'Not French only, but you may talk to us in Gascon or in Spanish; it matters not, we are ready to reply to anything you may have to say.' 'Well then,' said I, laying my hand on his arm, 'we have very important things to speak about,' and drawing him towards me, I added, 'come in and let us be seated.'

"There was but one chair and a small wooden stool. I took the chair, and pointed to him to take the stool. I then told him the object of our journey; of the wish felt by some of God's servants to do something for the present comfort, and still more for the everlasting welfare of the Basque Bohemians. 'Think you,' exclaimed the Bohemian with great force, 'that we know nothing about God?'—'You may know that He is a terrible being, but our wish is that you should know Him as a God of love.' I then with much earnestness spoke to them of the good news of salvation, when I was interrupted by one of them who exclaimed—'Alas, we are much greater sinners than you are.'—'Yes, that is very true,' said the others; 'we cannot expect forgiveness but on much harder terms than you.' 'Undeceive yourselves, my friends,' said I; 'if you go to Jesus who is the source of forgiveness, you, no less than we, will be graciously received.' I then asked whether, in case of a schoolmaster coming to instruct both them and their children; to teach them to read the word of God, and to know more of its author, they would give him a welcome reception, intrust their children to him, and go themselves to receive his instructions? The eldest of the party replied—'Assuredly we would; we ask for nothing better; let him but come, and he will be sure of a welcome.' 'I want you all, one by one,' said I, 'to answer;' on which they all exclaimed, 'Yes, Sir, yes.'

"The Bohemian orator then fully explained to them what I proposed, and when he had ended speaking, they all cried out—'We wish to have him! we wish to have him!' During this conversation betwixt the men and us, the women, who were standing outside, showed on their part how well pleased they were, and we could see that the prospect of instruction was regarded by these poor people as a great advantage. They promised to prevail on other Bohemians, who, without any fixed abodes, spend their days and nights in the forest, with no better shelter, even during snow, than the trees afford, to come and establish themselves near the religious teacher who was to be sent to them. On our leaving the spot, we took several of the children in our arms, and all the Bohemians affectionately shook hands with us, begging us not to delay returning with their expected teacher."

ON BURNING GLASSES.

II.



PARKER'S BURNING GLASS, NOW IN THE POSSESSION OF THE EMPEROR OF CHINA.

In our former paper we traced the progress of burning instruments down to the construction, by Buffon, of one consisting of a great number of flat silvered plates of glass.

Buffon next constructed instruments that would focalize at the distance of a few inches, instead of one or two hundred feet. He took a circular plate of glass, about two feet in diameter, perforated it in the centre, and fixed it into an iron frame. A very fine screw, fixed at the back, passed through the central hole, and worked in a nut on the other side, so that by turning the screw, the flat glass became drawn into the form of a concave mirror. The experiment was then tried, of giving it various degrees of curvature, in order that it might focalize at various distances; but, in the attempt to bend it more than it would bear, it broke; as did also another, three feet in diameter; but a third one, about eighteen inches in diameter, was preserved as a model of Buffon's ingenuity.

The cause of the fracture of these mirrors seems to have been through the perforation made in their centres. Buffon, therefore, proposed to get rid of this perforation in a singular way. He caused a circular glass plate to be fixed at the end of a cylindrical drum, made of iron or copper, and completely air-tight. The cavity of the drum being exhausted of air, by means of the air-pump, the glass was pressed in by the weight of the external atmosphere, and became a concave mirror. He afterwards proposed another mode of effecting this, without the aid of the air-pump; which was, to grind a small portion of the glass into the form of a convex lens, and to place a sulphur match behind it; the heat of the sun would kindle the sulphur, if the latter were in the focus of the little lens, and the heat would rarify the air within the drum, and make a partial vacuum. Other modifications of this contrivance have been proposed; but they are not sufficiently practicable to be mentioned here.

After this, Buffon constructed concave mirrors in a

different way, by bending plates of glass, aided by heat, on moulds of a spherical form, and having them afterwards ground, polished, and silvered on the convex side. But so delicate were all these processes, that twenty-one mirrors were broken out of twenty-four. One of the three successful ones was forty-six inches in diameter, and was regarded as the most powerful burning mirror in Europe.

Mirrors of a peculiar kind were made by Hoesen and Ehrard. They were built up of several pieces of solid wood, made concave on one side. This side was then covered with copper plate, highly polished, and in front of it was an iron arm, so placed as to receive any substance precisely in the focus of the mirror. The curve was a parabola, much more difficult to construct than a spherical curve. This form is so calculated for concentrating the parallel rays of the sun into a point, that although these mirrors were not coated with any more reflecting substance than copper, metals were rapidly perforated, vegetables and bones were immediately burnt to a cinder and vitrified, and the hardest stones resisted but a few seconds.

Newton's attention was directed to the subject of burning glasses, by some remarks of Gregory's, and he procured seven concave glass mirrors, each about a foot in diameter. One of these was placed in the centre, and the other six ranged round them at such angles, that the reflected rays were all focalized to one spot. The focal length was a little less than two feet, and the heat was sufficient to melt gold in half a minute, and to vitrify brick in one second.

Leiher, of St. Petersburgh, made many burning mirrors, the most curious of which was this: he made a concave frame of wood, and covered the concave surface with a paste, made of flour, chalk, &c., and on this paste he fixed a number of pieces of silvered glass, each about half an inch square; thus forming a compound mirror of numerous pieces.

After this, some elaborate calculations were made by M. Peyrard, as to the most effectual mode of combining a number of plane mirrors together, to produce a powerful effect. Where flat pieces are used, it is extremely difficult to arrange them in such a manner that the reflected images shall combine in one focus. Peyrard proposed to employ as many persons as there are mirrors, each person to have the management of a mirror, and, by means of some rather complicated apparatus, to hold or fix it in such a position as to assist in producing the desired effect. His arguments, however, though they might appear good in theory, were not of a nature to be easily put in practice.

We have stated that one distinguished modern writer conceives it to be not improbable that the effects attributed to the burning apparatus of Archimedes, were really produced, though not, perhaps, to the fullest extent. Another modern writer (in the *Encyclopædia Britannica*) comes to an opposite conclusion, from the results of Buffon's experiments. He says:—

A distinguished philosopher, in the end of the eighteenth century, with all the advantages of the amazing progress of science and the arts up to that period, has, after a laborious research, and numerous experiments, with all the leisure of philosophical inquiry, at last succeeded in construeting a combination of mirrors, which inflames combustible materials at a distance, and in a convenient situation. But when we consider the low state of the arts in the time of the Syracusan philosopher, the inferior reflecting power of any mirror then in use, the difficulty and expense of procuring such a number as would be necessary, and of combining them together, so as to act with facility and effect on an enemy's fleet,—seeing that even in Buffon's apparatus, it took half an hour to bring the mirrors to a focus; and, therefore, in the case of a vessel in motion, it would be next to impossible to follow it, and keep all the glasses steadily directed to one point,—if we consider all these circumstances, the difficulties of the undertaking must appear so enormously increased, that it seems to be no disparagement to the genius of Archimedes, to require stronger proof than has yet been adduced to convince us of the fact.

We shall now direct the reader's attention to those burning instruments which act by focalizing light transmitted through glass lenses, instead of reflected from mirrors.

Although it seems probable that the ancients were, to a certain extent, acquainted with burning glasses of such a form, yet the first one of any importance, of which we have an account, was made by Tschirnhausen. This was a convex glass lens, between three and four feet in diameter, with a focal distance of twelve feet, and the diameter of the focal image about an inch and a half. In order to reduce this image, the refracted rays were received on a second lens, behind the larger one, with a focal length of eight inches. The large lens weighed 160 pounds, and produced powerful effects. Wood, even when wet, was burnt instantly; small pieces of metal were easily melted; tile, slate, delft ware, pumice-stone, and talc, grew red, and then vitrified; sulphur, pitch, and resin, were melted, even when under water; the ashes of wood, vegetables, paper, and cloth, were converted into a kind of glass.

Buffon did not confine himself to burning instruments acting on the catoptric, or reflecting principle but he also made some on the dioptric, or transmissive plan. He first constructed a *water* lens; he combined two circular segments of a glass sphere, so as to form a lens-shaped cavity to be filled with water; these glass segments were first moulded into their proper shapes, and then regularly ground on both sides, so that the convex and concave sides were exactly parallel. The lens thus formed was thirty-seven inches in diameter; but with all the care that Buffon took in the construction, he found that he could not obtain results adequate to the labour bestowed, principally on account of the small refractive power of water.

Buffon proposed to construct a glass burning lens, with a smaller quantity of material than that of Tschirnhausen, although of the same diameter, and of greater power. In a large lens, the thickness at the centre is great, and the absorption of the rays of light is also great. He therefore proposed to form a lens of three concentric circular pieces, or zones, resting upon each other. Supposing the required lens to be twenty-four inches in diameter, this would require a central thickness of three inches, if the lens were one solid piece; but it might be built up piecemeal thus: let the central part be a lens, eight inches in diameter, and one inch thick; let this be inserted in the middle of a circular zone, whose internal and external diameters are respectively eight and sixteen inches; lastly, let this zone be inserted in an outer one, whose diameters are sixteen and twenty-four inches. If the curvatures of all the pieces were ground to the same radius, the solar rays would be refracted to a focus just as completely as if the lens were made in one solid piece, while the weight of material would be less, and the absorption of light less. We do not believe that Buffon actually constructed a lens of this kind; but the suggestion rests on sound principles.

The next lens we have to record was a modification of Buffon's liquid lens. M. Bernieres constructed, for M. Trudaine de Montigny, a lens, consisting of two spherical segments of glass, eight feet radius, and

three-quarters of an inch thick. When these were placed edge to edge, they enclosed a lens-shaped cavity, four feet in diameter, and six and a half inches thick in the middle. This cavity was filled with 140 pints of spirit of wine; and a lens was thus produced which would melt a farthing in half a minute. The focus was, however, very large, and, in order to concentrate it, the rays were received upon a second lens, by which they were brought to such a narrow focus, that pieces of forged iron were fused in fifteen seconds, and hardened steel melted in five minutes. Its effect on platina was curious; some grains of this metal appeared to be drawn together, diminished in bulk, and prepared for fusion; a little afterwards, it bubbled up and smoked; all the grains were united into one mass, but without forming a spherical button, like other melted metals.

The most powerful burning apparatus ever made was constructed by Mr. Parker, a London optician, about the beginning of the present century. It consisted of two convex glass lenses, connected together by the apparatus represented in our cut. There is a conical-shaped frame-work, at the upper and broad end of which is fixed the larger of the two lenses, and at the lower end the smaller lens. The large lens was double convex; when fixed in the frame it exposed a surface of thirty-two and a half inches; it was three and a quarter inches thick in the middle; focal distance, six feet eight inches; diameter of focus, one inch; and weight of the lens, 212 pounds. The smaller lens exposed a clear surface of thirteen inches diameter when in the frame; it was about one and a half inches thick in the middle; focal distance, twenty-nine inches; diameter of focus three-eighths of an inch; and weight of the lens twenty-one pounds. The combined focal length of the two lenses was five feet three inches; and the diameter of the focus, half an inch. The conical frame-work was intended merely to keep the lenses in their proper relative positions. A rack and pinion was placed beneath the machine, so that it could be elevated or depressed, according to the altitude of the sun. A little platform or stage was fixed behind the smaller lens, and the stage was capable of being so adjusted, that any substance placed on it would be precisely in the focus of the instrument. With this apparatus experiments were made before the Royal Society. Gold, platina, nickel, and cast-iron, were fused in three seconds; a cube of steel, weighing ten grains, melted in twelve seconds; minerals, gems, lavas, and bodies of similar refractory natures, were fused in times varying from sixteen to eighty seconds. A diamond of ten grains, when exposed to the lens for thirty minutes, was reduced, by evaporation, to six grains. Ten cut garnets were taken from a bracelet, and exposed to the lens; in a few seconds, they all fused together into a globular form. It is remarkable, as showing how little we yet know of the connexion between light and heat, that although the lunar rays are so beautifully clear and bright, not the slightest effect could be produced on a very delicate thermometer, when the lunar rays were concentrated on it by Parker's lens. A similar experiment was tried on the lunar rays, by Buffon and Tschirnhausen, but with a similar want of success; though millions of lunar rays were congregated in one spot, no sensible heat could be perceived.

Sir David Brewster, thirty years ago, proposed many improvements in the constructing of burning apparatus, chiefly by combining transmission and reflexion to produce joint effects; and there is no doubt that, in an optical point of view, these suggestions were worthy of the distinguished author. But so much has been done of late years, in the production of an intense heat by chemical means, especially by the oxy-hydrogen blowpipe; that it is not very probable that burning glasses, acting by solar rays, will occupy so much attention hereafter, as they have hitherto. The relation between a burning lens and the oxy-hydrogen blowpipe, is somewhat analogous to that between a sun-dial and a chronometer: the lens and the sun-dial can only be used while the sun is shining: the blowpipe and the chronometer are available in spite of weather, or of temperature, or of the darkness of night.

THE SMOKE-JACK.

"I give you joy of the report
That he's to have a place at court.
Yes! and a place he will grow rich in—
A turnspit in the royal kitchen."

A WORK of considerable learning and extent might be written on the application of self-acting machinery to the performance of processes which at one time were executed by the human hand, or by animal power. It is not many years ago that the turnspit was to be met with in every kitchen, almost as commonly as the cook; but now the smoke-jack performs, in a far more effectual and less expensive manner, the office which a little boy or a poor little dog once held. Indeed, one of the strongest incentives to the adoption of automatic machinery is the superiority and regularity of the work performed by it, compared with the productions of human or animal machines, that have a *will* of their own, not always controllable by a master's voice.

It appears that boys were employed to turn the spit, both before and after dogs were trained to that office. Du Cange speaks of a boy-turnspit so early as 1201. We also meet with an anecdote of Louis the Eleventh, (about 1460) to the following effect. A whim of the monarch led him to visit the royal kitchen, to see what was going forward. He found a little boy turning the spit. The boy was handsome, and his appearance so engaging, that the king thought him deserving of some better office than the one he filled. Louis accosted him, inquired whence he came, who he was, and what he earned by his employment. The turnspit, not knowing the king, replied to his queries, without the least embarrassment, "I am from Berny, my name is Stephen, and I earn as much as the king." "What then does the king earn?" asked Louis. "His expenses," replied Stephen, "and I mine." The king, pleased with the smartness of the reply, promoted the turnspit to the situation of groom of the chamber.

The employment of dogs as turnspits has given a distinctive name to a peculiar class of those animals. The turnspit is described as a spirited, active, and industrious kind of dog, once considered as an indispensable attendant on the spit, which, by a peculiar contrivance, and the aid of its own exertions, it was enabled to turn at an even pace. The body of this animal is long, the legs very short, and the tail curled on the back; its usual colour is grayish, with black spots. Gmelin notices three varieties of this family of dogs; one of which has straight feet, another curved feet, and the third has the body covered with long curly hair. The terrier is the Gmelinian *Canis vertagus*.

The method of teaching these dogs their duty was summary rather than humane. The dog was put into a hollow wheel, or drum, and a few live coals with him; thus situated, the poor animal could not pause without burning his legs; he therefore kept up a

constant gallop within this canine treadmill. It will be readily supposed that these dogs were not much attached to their profession; for, setting aside the unpleasant associations connected with their apprenticeship, it was hard work to run in a wheel for two or three hours, turning a piece of meat double or treble their own weight.

Many droll occurrences are connected with canine turnspits; we select one which took place at Bath many years ago. It is related that a party of wags hired the chairmen, on one particular night, to carry off all the turnspits in the town, and lock them up till the following evening. This was done; and next day multitudes of cooks were to be seen in the streets;—"Pray have you seen my Toby?" says one. "Why," replies the other, "I was coming to ask you if you had seen our Chloe;" when up comes a third inquiring for "her Pompey." There was no roast meat in Bath that day; but there was a good deal of perplexity on the one hand, and amusement on the other.

It will be seen from this anecdote, that the turnspits were under the especial protection of the cooks. The introduction of the smoke-jack has happily superseded the use of dogs; and modern cooks have transferred their affection to the cat, which, compared with its canine predecessor, does, indeed, enjoy a sinecure.

The principle upon which the smoke-jack acts may be shown by an easy experiment. Upon a flat disk of thin pasteboard describe the spiral, as in fig. 1; let this be cut out, and extended, by raising the centre above the first revolution. Make a small indentation in the centre of the spiral, and then poise it on the point of a wire, as in fig. 2. If the apparatus be placed on a warm stove, or the flame of a lamp or candle be applied below it, the spiral will turn round, apparently without any cause, and continue to spin with considerable velocity. The cause, however, is the air, which, being rarefied by the presence of a heated body, ascends, and thus produces a current which propels the spiral.

Fig. 1.

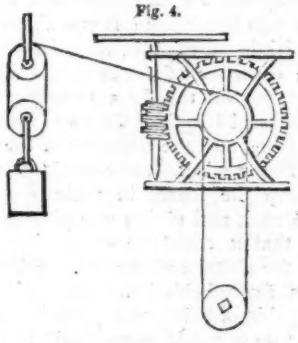
Fig. 2.

Fig. 3.

Upon this principle is the mechanism of the smoke-jack constructed, as represented in fig. 3. A number of vanes of thin sheet-iron are arranged in a circle, but they are all set obliquely. When a fire is lighted below, the air of the chimney becomes rarefied, ascends, and creates a partial vacuum: fresh air pours in, and, by the construction of the fire-place, the greater part of it must pass through the burning fuel. This gives to the "draught" of air in the chimney a considerable ascensive force, which force is greater in proportion as the chimney is tall; the ascending air, therefore, striking upon the surfaces of the inclined vanes, causes the spindle, to which they are attached, to rotate, and this motion is communicated to the spit by means of a small bevelled wheel, which works into another small wheel, placed upon a horizontal axis, with a screw cut upon the other end of it; this screw works into a wheel on the axis of the pulley that turns the spit, and the latter is thus carried slowly round. The vanes should be placed in the narrow part of the chimney, where the motion of the smoke and heated air is swiftest: the vanes should also occupy nearly the whole horizontal space of the chimney, so that the greater part of the current may be intercepted.

Another form of kitchen-jack is shown in fig. 4, in which the descent of a heavy weight is the moving power. In this machine a line, or chain, of considerable length, is coiled round a central barrel: the other end of this line is passed over pulleys, which are usually situated outside the house, so as to allow a greater range for the weight. A pulley is attached to the spindle of the central barrel, and another is attached to the spit, and both pulleys are connected by means of an endless chain. The suspended weight, in descending very slowly, uncoils the line by turning the barrel round, and thus the spit is made to revolve. To ensure an equable motion, and to get rid of those jerks and irregular revolutions which arise from the unequal spitting of the meat, a toothed wheel is placed on the axis of the barrel: the teeth work in a double-threaded screw, placed upon the spindle of a horizontal fly-wheel, which, rotating with considerable velocity, prevents any irregularity in the motion of the barrel. The weight is wound up by means of a key, which fits on to the projecting square end of the spindle of the barrel.

Fig. 4.



THE tree of knowledge is grafted upon the tree of life; and that fruit which brought the fear of death into the world, budding on an immortal stock, becomes the fruit of the promise of immortality.—SIR HUMPHREY DAVY.

THE affections imply a spirit of self-sacrifice, and often our virtues, like our children, are endeared to us by what we suffer for them.—SHARPE.

THE wheat, although it lies awhile in earth,
And seemeth lost, consumes not quite away;
But from that womb receives another birth,
And with additions riseth from the clay.
Much more shall man revive, whose worth is more;
For Death, who from our dross will us refine,
Unto that other life becomes the door,
Where we in immortality shall shine.—WITHER.

GENUINE praise, like all other species of truth, is known by its bearing full investigation; it is what the giver is happy that he can justly bestow, and the receiver conscious that he may boldly accept; but adulation must ever be afraid of inquiry, and must to their degrees of moral sensibility

Be shame to him, that gives and him that takes.
CRABBE.

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